



PROCEEDINGS

OF THE

ANTI-LOCUST CONFERENCE

Held at New Delhi on the 21st October 1941.

BY THE MANAGER, GOVERNMENT OF INDIA PRESS, SIMLA.
1941.

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List of delegates who attended the Anti-Locust Conference held in the Conference Hall, South Block, Imperial Secretariat, New Delhi, on the 21st October 1941.

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1. The Hon'ble Sardar Dasaundha Singh (Punjab).
 2. Mr. H. R. Stewart, C.I.E., I.A.S. (Punjab).
 3. Sir William Roberts, C.I.E. (Punjab).
 4. The Hon'ble Rao Sahib Gokaldas (Sind).
 5. Mr. Roger Thomas (Sind).
 6. Rao Bahadur K. I. Thadani (Sind).
 7. Mr. P. W. Marsh, C.I.E., I.C.S. (U.P.).
 8. Mr. C. Maya Das, I.A.S. (U. P.).
 9. Mr. A. M. Mustafa (Baluchistan).
 10. Mr. Mohd. Akbar Mirza (Kalat).

Rajputana States.

11. Mr. Y. Y. Syed (Palanpur).
12. Rai Sahib Ramlal (Alwar).
13. Mr. Lakshman Sarup (Alwar).
14. Mr. Omrao Behari (Kishengarh).
15. Mr. Lal Singh Shakhawat (Mewar).
16. Kunwar Prem Singh (Bikaner).
17. Mr. Iqbal Nath Kaul (Jodhpur).
18. Mr. Prakash Narain Mathur (Jaipur).
19. Mr. K. P. S. Menon, I.C.S. (Bharatpur).
20. Agricultural Officer, Bharatpur.

Central India States.

21. Mr. Sarvan Singh (Datia).
22. Mr. Charansingh (Indore).
23. Mr. Nand Kishore Dube (Rewa).
24. Mr. Badri Narain Singh (Orchha).
25. Rao Bahadur Sardar Singh (Bijawar).

Western India States.

26. Mr. Sohan Lal (Tharad).
27. Mr. H. H. Pandya (Katch).
28. Kunwar Sur Singhji (Nawanagar).

Punjab States.

29. Mr. F. Anderson, C.S.I., C.I.E. (Bahawalpur).
30. Mr. Warial Shah (Khairpur).
31. Mr. Brij Bhushan Lal (Jind).
32. Sardar Sadiq Mohd. Khan (Nabha).
33. Khan Bahadur Mirza Ghulam Saadani Khan (Malerkotla).
34. Lala Babu Lal (Pataudi).
35. Khan Sahib Abdul Hafeez (Dujana).
36. Sardar Puran Singh (Faridkot).
37. Pandit Padma Dutt (Tehri Garhwal).
38. Mr. Mela Ram (Bilaspur).
39. S. Harchand Singh (Patiala).

The Central Government were represented by the following :

1. The Hon'ble Mr. N. R. Sarker (Chairman of the Conference).
 2. Mr. J. D. Tyson, C.B.E., I.C.S.
 3. Mr. A. V. Pni, O.B.E., I.C.S.
 4. Mr. A. Hilaly, I.C.S.
 5. Mr. P. M. Kharegat, C.I.E., I.C.S.
 6. Dr. W. Burns, D.Sc., C.I.E.
 7. Rao Bahadur B. Viswanath, F.I.C., F.C.S.
 8. Dr. H. S. Pruthi, M.Sc., Ph.D.
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AGENDA OF THE ANTI-LOCUST CONFERENCE.

1. Reveiew of situation.
 - (a) Present position in regard to locust menace.
 - (b) Control measures :
 - (i) present organisation.
 - (ii) its efficiency,
 - (iii) its relation to long period problem.
2. Discussion of immediate problem with regard to :
 - (1) improvement of control measures,
 - (2) co-ordination of effort between Central Government, Provinces and States,
 - (3) availability of equipment and chemicals.
3. Preparation for the future on a long range programme :
 - (a) improvement of methods of control,
 - (b) improvement of organisation.

REPORT OF THE PROCEEDINGS.

The Conference met at 10-45 A.M. in the Conference Hall at the Secretariat. Opening the proceedings the Hon'ble Member, Mr. N. R. Sarker, said :—

“ On behalf of the Government as well as on my own I have very great pleasure in welcoming you all to this Conference. I am particularly happy that the very first problem I have to deal with after my assumption of office is one of such vital importance to the well-being of the agricultural population of north-western India. It is also a matter of great pleasure to me that it has provided me with an opportunity of meeting the representatives from various provincial governments and Indian States whose co-operation and assistance would be of the greatest help not only in solving our immediate problem but also many others with which we may be confronted in future. I am aware of the trouble and inconvenience most of you must have experienced in assembling here at a very short notice, and I greatly appreciate the spirit of service which has inspired you to come here in spite of such inconvenience with a view to contribute your share to the deliberations of this Conference and to bring it to a successful conclusion.

The importance of the problem of the locust menace is well-known to all of you, and it is certainly not for me who have just come from Bengal to drive home to you its urgency. In fact, its seriousness can hardly be exaggerated. A small insect the locust, although insignificant in isolation or in small groups, has been endowed by Nature with such tremendous power for evil when assembled in swarms, that it has brought ruin to vast tracts in many parts of the world including such advanced countries as the U. S. A. In India, it has in the past caused serious havoc to large tracts of north-western India and also at times to areas even further east. At the present moment it is seriously threatening to bring ruin once more to the ryots in the north-western parts of our country. The cultivator in our country is unhappily heir to many ills and menaces. Of these, the locust menace is a very serious one. The cultivator is generally so ignorant, tradition-bound and poor that individually or even in small groups he is absolutely powerless to effectively fight any of these grave evils. He can, however, emulate with great effect the ways of the locust itself. By mutual help, collective efforts and a co-ordinated organization he should be able to go on better than the locust itself and beat it decisively at its own game. Although the ryots themselves must play by far the most important part in combating the locust menace, a heavy responsibility also devolves upon the State to do all that it possibly could to assist them in fighting this evil.

I may mention here that considerable research work bearing on this problem has already been undertaken in this country. The experiences of other countries like the U. S. A., South Africa and Russia which have successfully combated this evil as well as the deliberations of international conferences held to consider ways and means of fighting this menace have been carefully studied. As a result of such research work and study, the Department has compiled very useful data in respect of such control measures as can be practically adopted in India and their effectiveness.

The Central Government maintains a permanent organisation, *viz.*, the Locust Warning Organization on a fairly large scale. The provinces of the Punjab and Sind and some of the Indian States have also started control organizations. Our problem now would be to expand the scope and effectiveness of existing control organizations, bring them into being where they do not exist now, and to co-ordinate the activities of all these agencies and offer them all possible advice, assistance and strength so that they may be enabled to effectively cope with the menace. By co-ordination, I do not simply mean that there should be co-operation between the Central Government, the provincial governments and the Indian States. This, of course, is necessary. But there should also be the fullest co-operation and co-ordination between the departments of government concerned in each province or Indian State, such as the Agricultural, Revenue and Labour Departments. For, each of these departments has to pull its due weight in successfully combating the locust menace.

In this Conference, you will have to decide after careful consideration what new organisation will have to be set up or how the existing organization will have to be strengthened with a view to make such co-ordinated efforts yield the desired results. In the second place you will have to consider what will be the most practical and effective control measures for combating the locust menace. And, lastly, you will have to discuss what difficulties may be met with in respect of labour, equipment and finance in adopting such control measures, and the ways and means of overcoming them. These are the problems which you will have to deliberate in this Conference, and then arrive at some concrete suggestions and plans of action for the effective solution of the problem with which we are faced. I appreciate the great complexities of the problem. But I believe your wide experience, your determination and your co-operative effort will be able to overcome any difficulties or complexities that may confront you.

I need hardly impress upon a gathering like this that the locust menace is not only imminent but, further, that it spreads with such rapidity that the institution of measures for combating it effectively will admit of no delay. I, therefore, hope that you will take a practical view of the whole problem and arrive at your decisions with all possible expedition so that the necessary machinery may immediately be set in operation.

Gentlemen, I have indicated to you only the broad outlines of the problem and its importance. Its nature and extent, both immediate and long range, the effectiveness of the present organization as also the control measures that may be adopted will be explained to you in details by Rao Bahadur Viswanath, who possesses an intimate and expert knowledge of this subject.

Before, however, I resume my seat, I should like to say a few words on the spirit in which this Conference should approach this problem. I should like to make an appeal to you to take a broad view of the whole question. It is possible,—and I do not say it would be wholly unjustifiable,—that provinces and states may examine the problem from the point of view of their own responsibility or interest alone. For, it may be that the locust may breed in areas which are desert lands, and are thus

unsuitable for cultivation so that the authorities there may evince an indifference to the depredations it may cause by swarming over neighbouring cultivated areas. Such an attitude would, I feel, be very shortsighted in the long run. The experience and economic trends since the last Great War have demonstrated that prosperity in any particular part of the globe cannot be securely or permanently built upon the adversity of another. Economic interests are more often inter-dependent than mutually exclusive. I believe we can also take another wholesome lesson from the experience of the present War. It is that the brutal ear of devastation led by the Nazi hordes has marched forward by isolating their enemies and proceeding against them individually. What the course of the War would have been if all the smaller nations of Europe and all the forces of democracy the world over had united from the beginning, is one of the saddest speculations of the present conflict. I think the analogy will hold good if we were to come down from an issue which today is shaking the whole world to its very foundations to a very much smaller problem, although great in its own sphere, with which this conference is confronted. The locust is a menace which respects neither territorial frontiers nor the demarcation of responsibilities between different governments, central, provincial or state. It must therefore be met with united and co-ordinated efforts whenever and wherever it assumes threatening proportions. I hope and trust that all concerned will fully comprehend the serious nature and the implications of this menace, and do all that they can to carry into effect with the utmost expedition the settled plan of action, irrespective of the direct and immediate benefit they may individually derive therefrom. If they would only be inspired by this attitude, not only will the efforts of this Conference be crowned with success, but, further, a lead will have been given here which I am sure will prove of great benefit in successfully tackling many complex problems in various other spheres. I shall not take any more of your time and it now only remains for me to express my fervent hope that your efforts today will result in formulating a plan of action which will remove a serious impediment in the way of the continued prosperity of a large section of our agriculturists."

The Hon. Member then requested Rao Bahadur Viswanath, the Director of the Imperial Agricultural Research Institute to describe the locust problem.

The Rao Bahadur said that the problem at present was confined to North-West India and involved the Punjab, United Provinces, Sind, Baluchistan, and neighbouring Indian States, Bikaner, Jodhpur and Jaisalmer particularly. This part of India had been subjected to periodical locust invasions for several centuries. There had been cycles of invasion lasting from 5 to 10 years, which did considerable damage. The last invasion was in 1926 and lasted till 1931. Up to that time our knowledge of locust control had been small, but fortunately at the time of the last invasion, the Imperial Council of Agricultural Research had come into existence and the Council immediately appointed two eminent entomologists Khan Bahadur Mian Afzal Hussain and Rao Bahadur Y. Ramachandra Rao to study the problem. These officers secured valuable information in regard to the life history of locusts and their movements. India had several homes of the desert locust—the Baluchistan coast and the desert areas of Rajputana. The entomologists had worked out the

life history of the insect and made available very valuable information about the period within which hoppers will develop from eggs and about the movement of the swarms, which had since been of considerable value in fighting the menace. It was ascertained that in the months of May, June and July locusts fly from the west to the east into Rajputana. In the monsoon they multiply and on the onset of winter in October-November they proceed to Baluchistan. There they again multiply and return to Rajputana, a large part of which was at present affected. It would thus be noticed that Sind was unfortunately affected twice every season as the locusts pass through Sind to invade the country and also retreat to Baluchistan over it.

The question of research was completed—as stated by Sir John Russel who visited India on the invitation of the Government of India to report on the work of the Imperial Council of Agricultural Research—and his advice regarding the establishment of a permanent organisation to keep a watch on the movements of locusts and inform all concerned to take effective control measures was accepted by the Government of India when, in 1939, at an annual cost of Rs. 30,000, it established a Locust Warning Organisation entrusted with the question of warning all the provinces and states concerned when an invasion was apprehended. In October 1940 the Locust Warning Organisation apprehended an invasion and the Government of India to meet the emergency sanctioned an expansion of the organisation, increasing the expenditure temporarily to rupees one lakh. In addition the Imperial Council of Agricultural Research had undertaken the publication of several small pamphlets giving the life history of the insect and methods of control. These had been translated into different languages.

The Rao Bahadur went on to state that he and his entomologist had assisted in setting up control organisations and had made extensive tours in the areas affected. When in September 1940 the organisation got the impression that the locust problem would soon become a menace, it was quickly expanded to give adequate warning, classes were held in Karachi and several other places where demonstrations and lectures explaining the position were given to officers of the respective control services in the provinces and states and advice was tendered regarding the securing of equipment for fighting the pest. All parts of the country likely to be affected were put on the “*qui vive*”. In Baluchistan, the local organisation had destroyed many swarms of locusts and it was hoped that by June this year, the problem would be brought under control. Unfortunately fresh swarms had come in from Arabia and Iran. The problem of locust control was of international importance. Iran, Arabia, Palestine, etc., have all been involved. The Government of India had made arrangements for obtaining speedy information from these countries. In July and August of this year large swarms invaded India from these countries and settled themselves in Cutch, Rajputana and Baluchistan, breeding very heavily as monsoon conditions were favourable, with the result that there had been an overlapping of the generations and several swarms had been created which had gone down the country as far east as Aligarh in the east and Nagpur in the South. It was expected that these would move back to Baluchistan with the onset of winter conditions. But as

soon as spring came they would rapidly multiply. If the multiplication took place it would be a colossal menace and the only effective control then possible would be by destroying the eggs and hoppers, as it was extremely difficult to destroy locusts on the wing. It meant then that arrangements for more concerted action would be necessary between now and spring (February next) to prepare not only for destroying the adult locusts that might be found during these months, but also to locate the breeding places, and destroy eggs and hoppers that might develop as the result of breeding on the advent of spring. That was the most important thing. These locusts were capable of destroying any crop that came in their way. In areas where there were agricultural and food crops or fruit orchards, all these would suffer; where there were no food crops but there was other vegetation suitable for goats and sheep, the vegetation would be destroyed and the animal industry would suffer. In any case it would be a general menace and the loss would be a general one. At the present moment they had a good organisation set up in the provinces and states concerned, but a more extended organisation was necessary, if they desired to fight the menace and stop it from assuming serious proportions in the coming spring.

The Hon'ble Member then requested representatives of provinces and states to give an account of the work done in their territories.

The Hon'ble Sardar Dasaundha Singh, Revenue Minister, who represented the Punjab, said that it was necessary to realise first of all the magnitude of the problem, and then devise measures to be adopted in dealing with it. The problem consists, he said, of four stages :—the first is the destruction of eggs ; the second the destruction of the insects while they are in the growing stage, i.e., crawlers, the third destruction of hoppers and the fourth the destruction of adult locusts. For (1) the old method of ploughing was the best ; for (2) and (3) the more elaborate remedial methods recommended have proved useless and the only way they found successful was trench digging. As regards hoppers until scientists throw further light on the subject he did not think poison was effective. So far as the fourth stage was concerned scientific methods may be of some use, for example poison baits while the locusts were resting at night or perhaps early in the morning when they were not flying.

He then proceeded to describe the measures Punjab had taken. Sodium fluosilicate had been used in the Punjab mixed in bran or other food grains. But this was a very tedious method, as poison baits were difficult to employ on a large scale and the same could be said of burning. He did not think that the burning method was employed on a large scale as shrubs have to be set on fire and green trees do not burn easily. Flames could be thrown by means of certain instruments but these instruments were costly. So the only successful method was the old method of destroying the insects at their initial stages. They had trained their agricultural and revenue staff in tackling this problem. It was essential eventually to train the revenue *patwaris*. They wanted to expand the present organisation in the Punjab still further by giving training to the co-operative staff, but that would take a lot of time. The staff already trained found it difficult to get the villagers generally to help in this matter. Besides the work had not only to be organised in villages but in the ~~differen~~

outlying places, in desert areas where breeding takes place on an exceptionally large scale. He considered that a Central organisation could not be of very great use to them. It could help them so far as guidance and advice was concerned, but all the rest was to be done in the different provinces and states. The main work of a Central Organisation was co-ordination and training. He concluded by saying that Punjab was prepared to co-operate by helping to train men from other provinces and States, if required.

Sir William Roberts (Punjab) said he represented the farmer's point of view. He was convinced that the vital need of the moment was publicity and more publicity. He would strongly advocate that the provincial and State Governments should regularly issue statements to the Press and that the Central Government should also issue monthly or fortnightly statements stating what damage was done and what steps were being taken to counteract the menace. The publicity thus given by issuing such warning notices was absolutely necessary.

Rao Sahib Gokuldas, Revenue Minister, speaking on behalf of Sind thanked the Hon'ble Member for organising the Conference and said that this year they were getting timely warnings from the Central Organisation. They considered that it was extremely difficult to kill the locust in the egg stage, but it was easy to kill hoppers in any stage before they could fly when it would again become very difficult to kill them. When they got the timely warning from the Central Organisation they had appointed a large number of officers of various departments to deal with the problem. They had immediately repeated the warning message in the Press and had already spent about 5 lakhs of rupees in fighting the locust. The heavy breeding in Sind this year was beyond doubt due to their having had 22 inches of rain in the desert areas.

From the very beginning they had pressed upon the Central Government to ask the neighbouring provinces and states, particularly Jaisalmer and Bikaner and some Rajputana States to take effective measures, as their reports were that many swarms came from Jaisalmer State side. The locust problem was one that affected the whole of India, as Rao Bahadur Viswanath had explained. They should all deal with it together, and Sind was willing to share the expenses. Sind was a deficit province; they were already in debt to the Central Government but they intended to continue to spend money on the locust problem in maintaining the organisation and propaganda for some time to come. But it must sooner or later be realised that it was a problem which could best be taken up by the Central Government and the provinces and states should be called upon to share the expense. If upcountry states had taken proper measures in time, Sind would not have been so badly affected.

Rao Bahadur Thadani, Director of Agriculture, Sind, said that he was fighting the locust war in the deserts of Sind. As Rao Bahadur Viswanath had already mentioned they knew that the areas in which these insects bred were the desert areas of Sind and neighbouring states. They did not breed in cultivated areas. Fighting these locusts in the cultivated areas was a different problem. They should view this problem as a two-fold problem. In desert areas the menace should be dealt with by concerted action to be arranged by the Central Government, while in the

cultivated areas it should be tackled by the Province or State concerned. The desert area problem at present was not being tackled effectively. The responsibility of fighting the locust in the desert was not that of state or province concerned alone. Other provinces and states should share the cost of facing the problem. They could overcome the locust menace only if concerted action was taken. This was not being done in many of the states. In Sind they had done their bit and Jodhpur had done very well but he did not think other states with desert areas had done their share of their work. It was responsibility of the Central Government to see that it was done. If proper action had been taken they might not even have seen these swarms.

The Rao Bahadur went on to state that the work that could be accomplished by the present Locust Warning Organisation was like a mere drop in the ocean. A total expenditure on the organisation of one lakh of rupees was absurd when it was seen that this amount was for the whole of North India. The Organisation should be expanded ten times and the cost should be shared by all provinces and States. Sind was quite prepared to spend more.

He then proceeded to describe the organisation in Sind and said that they had succeeded in controlling the direction of the march of the locust swarms to this extent that the swarms went direct to the trenches prepared for them where they were killed in millions. The process of killing went on day after day. They estimated that in this way they must have killed no less than 150 swarms. They could not deal with the menace in the egg stage in Sind as the Central Organisation had very few watchers for an area as large as 10,000 square miles. They had, therefore, to wait for the hopper stage. Had they been more effectively organised, they could have tackled the pest in the egg stage.

The problem offered no difficulties in the cultivated areas as cultivators could be persuaded to come out and fight the locusts. In desert areas, however, it was a most difficult problem. Nobody was available there unless Government was prepared to pay freely. The desert people were poor and could not afford to give their labour *gratis* even in the national interest. The Sind experience was that voluntary labourers in desert areas worked for a few hours and went away. They could not be blamed as they had then to go and earn their daily bread. So the Sind Government started paying. The need for fighting the locust in its desert home could not be emphasised enough. If the locusts were killed in the deserts, three-fourths of the problem was solved and only one-fourth of it remained for tackling in cultivated areas. It was impossible for a small state or province to fight the pest single-handed in the desert areas within its borders. It was a fight not merely for its own interests but for the interests of the whole of the country. Therefore equity demanded that all should share the cost of common desert war, no matter in which province or state the desert area was included.

Mr. Roger Thomas (Sind, non-official) thought it would be desirable to evolve the following organisation for effectively fighting the menace; a Central Bureau of Intelligence at the Centre whose main object would be to collect information with regard to egg laying activities. This

information should be comprehensive and correct. The centre should maintain a staff of observers only (not scientists) who should go about collecting information as to where eggs had been laid. This information could be obtained from ordinary cultivators who should be paid a monetary reward for any information given. The observer should then mark the spot by an earthen mound and report the site to the Bureau which should demarcate the area on a survey map and send the map to headquarters. Headquarters should then give information to the attacking organisation which could easily reach the spot by the time the eggs are being hatched. The best time to tackle the menace was when the eggs began to hatch. He tackled this problem in Iraq with some success and had found the hopper stage was the most effective stage and trench making was the only remedy. Sind was wise in quickly realising this. In desert areas however where population was thin it was extremely difficult to tackle swarms of hoppers. In those areas there was bound to be trouble about getting water and cheap labour and also feeding of labourers. The Central Bureau should be made responsible for giving information and provincial and state organisations should supply the material, equipment, etc. His idea in suggesting this was to save cost. Zinc sheets might be used to divert the hoppers into the trenches. Such sheets were not expensive; they were light to carry and their use would save the digging of a longer trench when labour was scarce. (The Hon. Mr. Gokaldas intervening at this stage stated that they had not found this successful in Sind.) Another method (continued Mr. Thomas) would be by spraying with calcium arsenate through ground machines or aeroplanes. In any case it was advisable to do all the experimental and educational work now so that next February the organisation should be ready with other methods if the trench method did not prove a complete success. Mr. Roger Thomas then showed those present an illustration of a ground spraying machine used in the Philippines and said that those machines should be tried in this country with same dust as was used in the Philippines against the boll-weevil. He concluded by saying that he was prepared to give further details if requested.

Mr. P. W. Marsh, Adviser to the United Provinces Government, said that so far the locusts had only invaded three districts of Muttra, Aligarh and Agra and had also passed over the districts of Meerut and Bulandshahr without stopping. His experience of the invasion of 1929 was that the only way of meeting the locust menace was to organise every available department and every available man of the local population. As the United Provinces were densely populated there was no lack of men. They had tried the method of flooding by releasing canal water which was available in plenty. It proved a great success. That course, of course, was not possible in Sind. Propaganda was very important. In Muttra, on the last occasion, the Brahmins created some trouble as they did not like to take life. The Agriculture and Education Departments could give a lot of help. School masters and their pupils could do very useful work. Mr. Marsh concluded by saying that on getting notice of this meeting while he was in New Delhi attending a Price Control Conference, he had felt it incumbent on him to return to the United Provinces and consult the Finance Department. He had asked his Finance Department whether they were prepared to give money for fighting the locust in

the desert areas elsewhere, to which he had received the reply that if it was established that the locust problem of U. P. could only be attacked effectively outside the province, a contribution would not be denied. (Applause).

Mr. Mustafa, Agricultural Officer, Baluchistan, said that they had divided their Province into ten circles. Seven were under the direct control of the Baluchistan Administration while three were under the Central Organisation. Each circle had an Entomologist who was assisted by two Mukaddams. They had trained a large number of their revenue officials. He thought the whole question was one of organisation. As regards the control measures the suggestions by the entomologists had proved very successful. In Baluchistan they had really killed millions of locusts and the work had gone on very smoothly. They needed a little more co-operation between revenue officials and the Locust Warning Officials. It was no use blaming neighbouring states and provinces. They should see what could be done in their own sphere and all states should co-operate. A certain proportion of the locusts come from the Iran side. In 1938 when he was in Afghanistan he noticed that the Government there had entered into an arrangement with the Soviet Government about this matter and he considered that it would not be a bad idea if their own Government entered into a similar arrangement with Iran and Afghanistan. The main difficulty in his province was that of communication. They were quite prepared to consider any proposals received from the Centre.

Mr. Anderson on behalf of Bahawalpur said that as a result of the locust attack on the eastern side of the State the damage was negligible but on the western side the damage was very heavy in certain areas. Big swarms came from the direction of Jaisalmer and Sind. The majority of the swarms spent only one day in the state and during this short stay caused considerable damage. Their Superintendent of Agriculture has been through all classes of locust training. He too had considerable experience in the United Provinces. He suggested the spraying method with calcium arsenate and that a Central organisation should look after locust breeding in desert areas. In the cultivated areas they were in a position to do enough but he doubted if states could tackle desert areas single handed.

Mr. Pandya who represented Kutch State said that fortunately Kutch had not proved a breeding place of locusts as they had merely flown over it while going east. Their first report was at the end of June 1941, when instructions were issued to all district officers to act in a co-ordinated manner on the measures suggested by the Imperial Entomologist. Most of their work was done through Revenue officials. Each district officer had been given a general idea of the problem and the measures to be taken to fight it. They had not adopted technical and scientific apparatus yet, but all practical ways like digging trenches, scaring, etc., had been tried. Their Brahmin cultivators co-operated in tackling this problem. But they had some difficulty with the Bania cultivators, on account of their anti-killing sentiments. They had one agricultural officer in charge of this problem but they had asked the Imperial Entomologist

for the services of a Locust Expert to help them in training their officers. They were always ready to co-operate with the Central Organisation.

Mr. Menon, the Dewah of Bharatpur, spoke next. He said the problem in Bharatpur was not very acute. A few swarms flew over Bharatpur in September and early in October. The damage done was negligible. The affected part was being kept under very close observation and if any hoppers appear they would be destroyed by all possible methods. Their villagers were also fully aware of the danger. Bharatpur had the misfortune of being situated next to Muttra and some of the villagers had conscientious objections to the destruction of locusts. But they had no objections as regards paying for labourers hired for this work. Monetary rewards were being paid for information received about the laying of eggs. Their locust organisation was under the Revenue Minister who fought the menace in 1929 and fought it with great success.

Mr. Puran Singh on behalf of Faridkot State said that his State had no desert lands. They had an excellent locust organisation but had had no attack for the last 10 or 15 years. They were, however, keeping everything ready for eventualities.

Mr. S. M. Khan on behalf of Nabha State said that they were adopting the same measures as the Patiala Government had adopted, and he would leave it to the representative of that State to give details.

Mr. H. Singh, who represented Patiala State, said that his experience was that it was very easy to destroy these insects in the egg stage. It was not very difficult to find out where the eggs were laid. They had taught their people how to destroy locusts and had actually killed millions of them. They had found sodium fluosilicate a costly remedy. The irrigation or flooding method was easy and by far the cheapest. They had tried ploughing but it was not very effective. Mr. Singh then promised to give the convenors of the Conference a copy of the note prepared by his Department on the anti-locust measures taken in the Patiala State.

Mr. Wariial Shah of Khairpur spoke next. He said that he agreed with representatives of U. P. and British Baluchistan that they should not accuse others. Khairpur had done what was possible and had succeeded to a very great extent in its efforts. They had only one desert area affected (NARA DESERT) and they had tackled the problem under the guidance of the Central Organisation. But they did not have much to do as they had had no rain and the locusts that came could not breed. In spite of the fact that they had no locusts in Khairpur at present they were still maintaining their staff.

Locusts first appeared about the 19th October last in Khairpur. They had collected all the officials of their Revenue Department. They had canal telephone connections everywhere so that communication was easy. He considered that educating the people was the most important matter. Even some of the Musalmans had sentimental objections to killing locusts as it was believed that when there were locusts there would be no famine. He agreed with the Sind representative that it was very difficult to get labour in desert areas.

Mr. Sardar Singh on behalf of Bijawar said that they had no serious problem in their State but were prepared to co-operate with any scheme that the Conference may suggest.

Kunwar Sur Singh of Nawanagar said that their experience of the locust menace in Nawanagar was practically the same as that of Kutch. Locusts do not breed there but visited the State every 5 or 10 years. He would strongly suggest the adoption of two measures. One was aeroplane spraying as was done often in South Africa against the same pest; and the other was propaganda through magic lantern slides showing the different stages of locust breeding, their life history, etc. This would help to educate the people.

Mr. Charan Singh on behalf of Indore said that no serious damage was done by the two swarms that merely passed over his State. They had kept an organisation ready to deal with the menace, and his Government was always ready to co-operate with the Central Government. His experience in 1929 was that flame throwers were of no use. Flooding also was not successful, if the water lay only for a short time. It was essential that where flooding was possible the water should stand on the ground for a longer period to really kill the eggs (at least for two days). He considered that trenching was the most effective and the cheapest method.

Mr. Kaul representing Jodhpur said the problem had three aspects—

- (i) Organisation;
- (ii) Co-ordination; and
- (iii) Actual control.

The most important was co-ordination. Some of the States and provinces were not co-operating freely so it was better to have the Central Government as a third party which could supervise the work of all. He would suggest that they should have a Board on which there should be representatives from all provinces and States so that they could keep themselves posted as to the extent of the menace and what each party was doing.

Mr. Mathur on behalf of Jaipur said that all the seven swarms that visited his state came from Bikanir side. They did not stay long and they had been unable to do much damage. They had trouble mostly in the desert area. Fortunately no extensive breeding had taken place there except in one tahsil. The Report was that breeding had taken place on a hill and eggs were found even on trees. He would request Rao Bahadur Viswanath to examine this aspect of the question. Every Department of his Government was taking interest in the locust control measures and they had sent timely information to the Imperial Entomologist.

Their cultivators knew this pest very well and their experience was that trenching was the best method.

Mr. Lal Singh who represented Udaipur said they were visited by adult locusts on the march but no egg laying took place. There was a sentiment in the state that large masses of living things should not be killed. The State had sent one official for training and had made village officers responsible for timely information about swarms of locusts. No

serious damage had been caused. They were quite prepared to co-operate with the Central Government. He agreed that a Central Organisation to deal with this problem was absolutely necessary.

Mr. Umrao Bihari on behalf of Kishengarh assured the Conference that Kishengarh had its organisation ready and would co-operate to the fullest extent.

Mr. Syed on behalf of Palanpur said that they had two swarms of locusts and had taken all possible measures to deal with them. As Palanpur was a small state they depended mainly on the Central Organisation.

Rai Sahib Ram Lal on behalf of Alwar said that Alwar was not a big breeding place of locusts. They were very grateful to the Imperial Entomologist for his timely information from time to time. They had sent three officers for training to New Delhi, and had developed a thoroughly good organisation for this problem. There was damage from time to time from the swarms of locusts that visited the State. Only recently the Imperial Entomologist had visited the affected area and in one or two villages he had found some hoppers. They had since destroyed these. He thought the most effective method was that of trenches, but they should be deeper than those advised. They were prepared to help and co-operate in every possible way.

Kunwar Prem Singh on behalf of Bikaner said that his State was not entirely a desert area. Only some portion of it was desert and there were certain tahsils with a very sparse population. So far as his information went this year's locusts were not bred in the Bikaner desert, but came from the Sind side. They had been doing all that was possible and had issued detailed instructions for the destruction of locusts. They were co-operating with the Central Organisation to the best of their ability. They had had some locusts in September which laid eggs from which hoppers had emerged. All possible action was being taken to destroy them. Trenching has been very successful but he was sceptical about chemical methods. He concluded by supporting Sind's suggestion that the expenses of the desert war should be shared by all.

Dr. Burns, the Agricultural Commissioner to the Government of India, then addressed the Conference. He said that he wanted to make it clear that they were not only contemplating action over an extended area but over an extended period of time also. One of the members speaking previously had indicated that they had been subject to invasions from the neighbouring territories of India and that many swarms of locusts had approached from that direction. He recognised that this has been a great problem for India as our locusts generally came from there. It was curious that when locusts had attacked us here they had also at the same time attacked Arabia, Palestine, Afghanistan and Persia. His opinion was that India should organise and her organisation should be for a considerable number of years to have any effect. Although they had one organisation at present, it ought to be on a bigger scale and co-ordination seemed to him to be of great importance in any work of organisation and inspection. Anti-locust work was necessary not only where locusts appeared but elsewhere as well. They were dealing, as it were, with an

- attack of parachutists, who although being looked after by the Home-guards, would have to be destroyed by the use of regular troops. The last invasion had lasted for 5 years and it was noticed that its worst phase came in 1929 exactly three years after it began. He concluded by saying
- that co-ordination consisted of three things—

1. Information.
2. Organisation.
3. Inspection.

At this stage **Sardar Dasraundha Singh**, the Punjab delegate, again addressed the Conference. He said that the speeches of the delegates had revealed that there was general agreement that the trenching method was the best and that chemical methods were not very effective and were certainly expensive. He fully shared these views.

Referring to the Sind's case for sharing the expenses of the desert war, he said that the appeal of his Sind friends was mainly sentimental. If they had spent five lakhs in Sind, they had benefited their own people as all the materials were purchased from Sindhis and the labourers who obtained wages were entirely local people. He was strongly against a subsidy being given to Sind for the desert war as this would inevitably result in other states and provinces making similar demands. The latter would base their demands on the cry that they had also done as much work as Sind if not more.

He thought the Central Government should only co-ordinate and advise and leave it to individual provinces and states to take the active part in fighting the locust within their own territories. For this purpose he thought the present Central Organisation was quite adequate and further expansion was quite unnecessary. At the most, he said, it might be desirable to create a small body composed exclusively of Sind and the Rajputana States which should meet at frequent intervals to consider and take control measures from time to time.

The Conference adjourned at this stage for lunch.

When the Conference re-assembled at 3 p.m., the Chairman observed that the discussions had revealed that there was general agreement on many matters; for instance everybody had realised that effort must be co-ordinated to fight the menace. There was no difficulty as regards cultivated areas. What was not clear, however, was the method by which the pest could be controlled in the desert area where labour was scarce. He therefore, wanted suggestions on this aspect of the problem.

Mr. Roger Thomas (Sind), said that the Central Bureau should have an intelligence staff part of which should be permanent and part sub-permanent. The permanent staff should be employed during the pre-invasion period. When the swarms had arrived and hatched the sub-permanent staff (which should be more numerous) should be recruited. The states and provinces should prepare in advance lists containing the number of officers from various departments that could be mobilised and put at the disposal of the Central Bureau for fighting the locusts. The Central Bureau might indicate to the Provinces and States concerned what was expected of them when the need arose. If the lists were

prepared by the States by designation with order of priority, when the demand came they could lay their hands on the persons whom they could spare. In addition to that labour would be wanted and that was going to be by far the biggest factor.

With regard to the financial aspect, he suggested that the cost of the intelligence sections, both permanent and sub-permanent, should be borne by the Centre. He reiterated that information obtained from villagers must be paid for to encourage them to come forward with prompt and correct news of locust movements. The cost of the executive staff should be borne by the Provinces and States concerned. With regard to the labour costs, he suggested that as small States could not be expected to bear all the costs of the desert war, it should be made known in advance that all labour costs would be distributed between the provinces and States on an equitable basis *e.g.*, on an average of the total crop area of the past 5 years. It might be difficult to find an equitable basis but it should be done. For the purpose of the equitable distribution of this charge, he would throw out the suggestion that in irrigated areas one acre should be counted as equivalent to two acres in non-irrigated areas in other words irrigated areas should be assessed at twice the rate applicable to non-irrigated. He concluded by expressing his surprise that when even some of the smaller States where no breeding occurred had volunteered their widow's mite in support of any co-ordinated scheme, the Punjab had taken up such an unfavourable attitude on the question of sharing the cost of the desert war.

Sardar Dasaunda Singh (Punjab) spoke in reply. He said that so far as the intelligence work was concerned, the Central Government was doing it already; but he felt it was difficult to depend on the Central Bureau as even if it employed more than 60 persons for mere intelligence alone and if each of these persons was getting between Rs. 100 and 200 as salary, it would make the intelligence work too costly. He, therefore, thought it would be better to depend on local people for information. There was no need to have a costly expert staff solely for this work. Watching and reporting of swarms could be done by local people. There was no need for a Central agency for this purpose. So far as research was concerned it should be confined to a few people. The present staff of the Central organisation was adequate for this purpose and could be expanded if necessary. As regards the executive staff he thought that here too help from the Central agency was not necessary. The training of the executive staff was the only thing that was required. This was already being done. New men were not necessary as this was a thing which would happen only once in 5 years or 10 years. If they engaged a new permanent staff, the staff would be idle at least for 4 or 5 years. They already had so many people who could be of use, *e.g.*, the Revenue, Agricultural staff. Co-operative staff and above all the educational staff. All these agencies could be utilised and all that was necessary was to give them a little training. Local agencies were best both for intelligence and control. An expensive central staff for watching and executive work was quite unnecessary.

Sind was not the only desert place, there were other places like Rajasthan, etc. All that should be done was for each Province or State to

employ its own subjects in their own locality and Sind would also have to depend on her own local people. It was not practicable to send her help from outside by engaging staff for Sind at some other place. If Punjab sent her trained staff to Sind they would be of no use in strange surroundings. Therefore if the executive staff was to be supplied by the very province or state where the trouble had arisen no question of monetary help from outside could arise.

At this stage Mr. Thomas intervened and asked the Punjab delegate to give his constructive suggestions rather than concentrate on criticism. Sardar Dasaunda Singh said in reply that he objected only to the cost side of Sind's suggestion as he thought that every Province should look after its own problem. On the labour side he thought that labour too should be employed in its own locality as the money that was spent on it went directly to the people of the province concerned so that what the local taxpayer paid in taxes was returned to him in wages which meant that the Province was getting the money from the people and was then paying it back to the people. That settled the argument so far as the question of cost was concerned. So far as the labour side of it was concerned, the only way in which the Central Government should help them, whether it was Sind or some other State, was by supplying guidance and by stirring up the States to discharge their share of the responsibility for locust destruction. If Sind people realised their responsibility he thought they could cope with the situation however grave it might be. If Punjab was to help Sind or if the Central Government were to help Sind, why not help Baluchistan? There was absolutely no need for the Central Government or for other States to spend their money on Sind. He concluded by saying that he feared no State would agree to that proposal.

Mr. P. W. Marsh of United Provinces said that the real question was how to contribute towards the cost of fighting the menace in the desert area where the breeding takes place. Was it their duty to help those States which were unfortunately placed? The Punjab would have it that each should bear his own burden. But he himself thought that if the Centre was of opinion that Provinces which had highly cultivated areas were in danger from desert breeding and should therefore help desert States to fight the locusts, the U. P. Government would be willing to agree to it. He would entirely put his trust in the Government of India and he thought on the basis of his knowledge of the Imperial Council of Agricultural Research they would get a fair deal.

Mr. Mustafa (Baluchistan) said that it was essential to do control work in the desert area first, as if it was not done there, every province would be affected. As regards the question who should pay, it was quite obvious that the expense should be shared by all Provinces.

Mr. C. Maya Das (United Provinces) said that in his opinion the arguments were all in favour of assistance from outside.

The Hon'ble Mr. Gokuldas (Sind) said that Sind could not single-handedly without outside help look after the large desert area contained within its boundaries. The desert problem concerned all provinces and States, and therefore like the present war it was in everybody's interest to offer mutual help.

Rao Bahadur K. I. Thadani (Sind) said that from his personal experience of anti-locust work in the desert he was satisfied that it would be very necessary to divide all the desert areas located at different places—whether in Sind, Jodhpur, Jaisalmer or Rajputana—into smaller and manageable units. At present Sind sent Sind was one unit. That was absurd. A proper and more suitable unit area should consist of 100, 200 or at the most 500 sq. miles. Each unit would have to be watched by a certain minimum staff. When hoppers appear, this unit staff should be empowered to employ up to a certain number gangs of paid labourers to destroy the hoppers. Each unit staff should look after its eggs, hoppers and adults from beginning to end. The unit staff should be expanded in active times and reduced in passive times. The Central Organisation should be responsible for the unit staff of each unit. Unless each unit was watched by a district staff, as was happening at present many desert areas would completely escape notice and locust breeding would continue to flourish.

Mr. Tyson (Secretary, Education, Health and Lands Department) asked Mr. Thadani whether granting that the desert were divided into such units it would be practicable to keep gangs of people actually ready for work in the units and whether it was physically possible to keep the people alive in the desert.

Rao Bahadur Thadani replied that the locust organisation and the research carried out by the Government of India had given them such valuable information of the time, place and duration of breeding that they could easily say what was going to happen three months hence. The Central organisation thus knew definitely where the breeding places were, when the locusts would come and when they would breed, etc.

Mr. Tyson said he was aware of this but if gangs of workers were to be kept in particular areas for at least three months at a time, (while the eggs were hatching into hoppers) would it be possible to persuade the labourers to remain in those desert areas for that length of time.

Mr. Thadani replied that it was quite possible.

Mr. Tyson asked further whether it was possible to supply water and food to the labourers in these areas in order to keep them alive.

Mr. Thadani replied in the affirmative and said that they had been doing that in Sind and had maintained 2,000 coolies in the desert. The organisation would work very satisfactorily provided they had a certain number of permanent men and certain number of sub-permanent men as suggested by Mr. Roger Thomas. It was best to have a nucleus staff everywhere which could be expanded or reduced according to necessity.

Mr. Mustafa (Baluchistan) said that he differed from Mr. Thadani. His experience in Baluchistan was that it was very difficult to collect and maintain labour gangs in desert areas.

Mr. Akbar Mirza (Kalat) said that they had only 250,000 men living in 72,000 square miles. They could neither get nor afford to maintain a large number of labourers.

Kunwar Prem Singh (Bikanir) said that he could not agree to Sind's suggestion. Units already existed in the conformation of State boundaries. The creation of different units transcending political boundaries would only lead to complications. Control would become defective and more expensive. He agreed with the Punjab delegate that the menace should be controlled by States and provinces separately. The Centre should only give advice and guide their work. As far as Bikanir was concerned, they wanted to deal with their part of the menace independently and by themselves.

Mr. Warial Shah (Khairpur) said that as regards the desert war, he agreed with Mr. Thadani that there should be smaller desert units. It was wrong to have the whole of Sind, or of Bikanir, Jaisalmer or Jodhpur as one unit each as at present. Nor was it right that they should be left to themselves to fight the menace as the present desert area in each state was too big for this purpose. He felt, however, that no matter how many units of the proposed size each state was divided into, the State itself should be responsible for the work of all such units. The responsibility should not be shared with the Central Government or with other States. Labour should not be imported from other provinces. As regards expenditure he felt that as far as possible it should generally be borne by the State affected with rare exceptions in whose case on account of lack of resources help should be forthcoming from all other provinces and States. He said this because he felt that if they were going to have a Central organisation, and if that organisation was going to pay for them they would not be able to do good work because their responsibility was divided. On the other hand if each of them was to bear the whole expense, they would take more interest in the work. Money might be wasted because it was given by others and did not come from their own pocket. But if each was fully responsible and if each had to pay from his own pocket then it would not be wasted.

Mr. Kaul (Jodhpur) said that there were two aspects to the problem: Labour and intelligence. With regard to intelligence, there was nothing the having a third party. It was very necessary. Their difficulty to-day was one of co-ordination. Experience had shown that it was absolutely essential to have some outside agency which could co-ordinate both intelligence and labour. There was a need for a third party who would not only guide them but tell them about the work their neighbours were doing and thus bring about in effect a sort of co-ordination. Unless there was co-ordination, they would always be throwing stones at one another.

Another advantage which the Central Government had was this that they had a large sphere of activity and hence knew the localities where locusts were wont to breed. They could thus give timely information. As regards labour it should come largely from the territory itself, and as for financing it he would suggest that the question should be referred to a special committee.

Dr. Burns (Agricultural Commissioner) said that so far as the current year was concerned the invading swarms had already come. Though they had not done much damage, they had bred children and grand children. One fact had emerged (and this was most worrying) that they could not stop their breeding. They had asked themselves

why ? Because they had missed controlling certain desert areas. The only way they could avoid a similar mistake in future was by having a number of flying squads which would attack breeding everywhere.

Sir William Roberts (Punjab) said that the only way to tackle the problem was to tackle the breeding areas. The Conference had generally reached this conclusion. If the Government of India did not propose to make any organisation for helping the states and provinces except in the matter of information and if necessary, of advice, each State and province would have to look after itself, but he would support Mr. Roger Thomas's suggestion regarding finance if the Central Government decide not to spend more money. His personal view was that if the desert breeding areas were a danger to the Punjab, the Punjab should not withhold help.

At this stage Sardar Dasaunda Singh (Punjab) spoke again. He said that if, as a spokesman from Sind had suggested, an area of 200 sq. miles was to form a unit, there would be 100 units in Sind alone. The whole idea was Utopian. He was certain that even a unit of 200 sq. miles would be unmanageable. A proper unit should not consist of more than 10 sq. miles. It should be remembered that Sind had 10,000 sq. miles of desert. In his opinion Sind should do its own duty. It was quite enough to let the present organisation remain in its present state. At the most, it could be expanded a little. States should not depend on their neighbours. They should exert themselves and realise their own duty. If necessary, they might seek some help from the Central organisation.

The discussion among the delegates having concluded, the Hon'ble Member summed up the proceedings. He said that the matter had been thoroughly discussed and the meeting could be said to have arrived at certain conclusions. He gathered that it was generally agreed that out of the three main functions, namely intelligence, organisation and inspection, the Central Government should supply intelligence through its information staff and help the States and provinces with advice as being done at present. He had noted the suggestion that the Central organisation should be strengthened if necessary. Regarding the actual control work, it was unanimously agreed each province or State should be responsible for the work within its own territory and each would do its utmost to maintain and strengthen its controlling organisation. So far as the desert areas were concerned, they had not been able to come to a general agreement. For the present, therefore, there was no other alternative but to let each province or State continue to be responsible for the control work in its own deserts. Meanwhile the Central Government would consider whether any scheme could be devised for more effective control in desert areas and the sharing of the expenditure thereby incurred. As regards the division of desert areas into workable units, it was not possible to accept Sind's suggestion as Bikanir and the Punjab had opposed it. This must also be left for further consideration.

Rao Bahadur Gokuldas (Sind) intervened and wanted to know whether it was proposed to form a Committee for that purpose. The Hon'ble Member, replied in the negative but added that the Central Government would consider the suggestion and if necessary take further steps in that direction. The meeting concluded at 4-30 p.m.

Summary of conclusions reached by the Anti-Locust Conference which met in New Delhi on the 21st October, 1941.

1. There should be the maximum co-ordination among the various authorities (Central Government, Provinces and States) engaged in fighting the locust menace.

2. The Central Government should continue to supply intelligence through its Locust Warning staff and help the Provinces and States with advice. If necessary they should expand their staff.

3. Each province and State should continue to be responsible for the actual control work within its own territory, both cultivated and desert, and should do its utmost to maintain and strengthen its controlling organisation. Inspection and report by the technical staff of the Locust Warning Organisation as to the adequacy of local arrangements was generally welcomed.

4. The Central Government should, in the meanwhile, examine the problems of location and destruction of locusts in their early stages in the desert areas, which, rather than the cultivated and populated areas, present the real difficulty, and of the incidence of the expenditure involved.

5. Generally, the driving of locusts into trenches in the hopper (wingless) stage is the most practicable and effective method of destruction, but this does not preclude the possibility and even desirability of experimenting with scientific methods found successful in other countries, particularly for areas difficult of access.

